

SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING JULY, 1928

By HERBERT H. KIMBALL, Solar Radiation Investigations

For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1924, 52:42; January, 1925, 53:29, and July, 1925, 53:318.

Table 1 shows that solar radiation intensities were close to the normal values for July at all three stations.

Table 2 shows that the total solar radiation received on a horizontal surface directly from the sun and diffusely from the sky was above the July normal at Washington, slightly below at Madison, and decidedly below at Lincoln.

Skylight polarization measurements made at Washington on seven days give a mean of 46 per cent, with a maximum of 48 per cent on the 16th. At Madison measurements made on eight days give a mean of 61 per cent with a maximum of 72 per cent on the 14th. These are close to the corresponding average values for July at Madison and somewhat below at Washington.

TABLE 1.—Solar radiation intensities during July, 1928

[Graham-calories per minute per square centimeter of normal surface]

Washington, D. C.

Date	Sun's zenith distance											Local mean solar time
	S. a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		
	75th mer. time	Air mass										
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	
July 2	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
July 3	13.13				0.81	1.03					12.24	
July 6	14.60	0.36	0.47	0.61	0.85	1.15					13.61	
July 9	13.61	0.63	0.76	0.93	1.10	1.32					14.10	
July 16	19.23			0.69	0.88	1.22					17.37	
July 17	15.11	0.54	0.64	0.75	0.93	1.29					12.68	
July 18	16.79		0.52	0.62	0.83	1.11					14.10	
July 19	18.59				0.70						18.59	
July 24	14.10			0.74	0.85						16.20	
July 25	15.65	0.51	0.64	0.73	0.94						15.65	
July 30	14.10				0.97	1.31					13.13	
July 31	9.83				0.77						10.59	
Means	14.10			0.74	0.94						11.38	
Departures		0.51	0.61	0.73	0.88	1.20						
		-0.05	-0.04	-0.03	-0.01	+0.03						

Madison, Wis.

July 3	9.14				1.17	1.35					9.83
July 6	6.76				1.03						7.87
July 7	7.29				1.05						9.47
July 11	6.27					1.30					10.59
July 23	10.21				1.14	1.32					10.97
July 24	10.21				0.93						10.59
July 25	11.38				0.92						15.65
July 28	8.81				1.19						12.24
Means					1.06	1.32					
Departures					+0.01	+0.04					

Lincoln, Nebr.

July 3	14.60				1.11	1.35					18.59
July 6	14.60						1.10	0.90	0.76		14.10
July 7	16.79				0.98						16.79
July 9	12.24		0.85		1.01	1.18	1.32				13.13
July 13	13.61		0.74		0.88	1.13					10.97
July 26	15.65			0.83	0.83	1.08	1.31				13.13
July 27	11.38		0.60	0.78	0.95						8.81
Means			0.75	0.90	1.09	1.33	(1.10)	(0.90)	(0.76)		
Departures			-0.04	±0.00	±0.01	±0.00	+0.04	+0.02	+0.02		

† Extrapolated.

TABLE 2.—Solar and sky radiation received on a horizontal surface [Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation						Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Twin Falls	Washington	Madison	Lincoln
1928	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
July 2	697	524	612	496	416	781	+206	-11	+29
July 9	449	542	531	436	310	682	-29	+9	-55
July 16	507	429	500	311	348	775	+37	-79	-69
July 23	510	542	482	408	439	711	+38	+50	-54
Excess or departure since first of year on July 29							+232	-697	-2,386

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. C. S. Freeman, Superintendent U. S. Naval Observatory]
[Data furnished by Naval Observatory, in cooperation with Harvard, Yerkes, and Mount Wilson Observatories]

The differences of longitude are measured from central meridian, positive west. The north latitudes are plus. Areas are corrected for foreshortening and are expressed in millionths of sun's visible hemisphere. The total area, including spots and groups, is given for each day in the last column]

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longitude	Latitude	Spot	Group	
1928							
July 1 (Naval Observatory)	h. m. 11 32	° -72.0	° 106.7	° -27.5		370	
		-24.0	154.7	+5.5		31	
		-20.0	158.7	+19.5		15	
		-17.0	161.7	+5.0	0		
		-6.0	172.7	+8.0	25		
		+17.5	196.2	+18.0		77	
		+22.5	201.2	+18.0		52	
		+32.0	210.7	+16.5	15		
		+37.0	215.7	-20.0		556	
		+40.0	218.7	-11.0		18	
		+44.5	223.2	-21.0	123		
		+46.5	225.2	+12.0	25		
		+54.0	232.7	-12.0	123		
		+71.0	249.7	+9.0	62		1,501
July 2 (Naval Observatory)	11 36	-65.0	100.4	-28.0		278	
		-58.5	106.9	-27.5	185		
		-56.0	100.4	-16.5	9		
		-11.0	154.4	+7.0		15	
		-3.0	162.4	+5.0		6	
		+8.5	173.9	+7.5	22		
		+32.5	197.9	+17.5		154	
		+49.0	214.4	-20.0		525	
		+53.5	218.9	-12.0		62	
		+59.0	224.4	-22.0	123		
		+60.0	225.4	+12.0	31		
		+67.5	232.9	-12.5	123		1,533
July 3 (Naval Observatory)	12 8	-51.5	100.4	-28.0		278	
		-47.0	104.9	-27.5	278		
		+22.0	173.9	+8.0	15		
		+24.5	176.4	+11.5	6		
		+38.5	190.4	-14.0		25	
		+41.0	192.9	-11.5		9	
		+45.0	196.9	+17.5		123	
		+62.0	213.9	-20.0		648	
		+66.0	217.9	-12.0		123	
		+70.5	222.4	-22.5	93		
		+82.0	233.9	-12.5	123		1,721
July 4 (Naval Observatory)	11 38	-40.5	98.4	-28.0		185	
		-34.0	104.9	-27.5		309	
		+40.5	179.4	+11.0		15	
		+55.0	193.9	-13.0	6		
		+57.0	195.9	+17.5		77	
		+72.0	210.9	-19.5	340		932
July 5 (Naval Observatory)	13 53	-86.0	38.4	+6.5	309		
		-26.5	97.9	-28.0		278	
		-19.5	104.9	-27.5		247	
		+50.0	174.7	-7.5	3		
		+52.5	176.9	+11.5		46	883
July 6 (Naval Observatory)	12 5	-78.0	34.2	-12.0	123		
		-72.5	39.7	+7.0		401	
		-16.0	96.2	-29.0		93	
		-12.5	99.7	-28.5		93	
		-8.0	104.2	-28.0		278	
		+67.5	179.7	+11.0		9	
		+68.5	180.7	-8.0	6		1,003
July 7 (Naval Observatory)	11 16	-68.0	31.4	-9.5		93	
		-64.0	35.4	-11.0	132		
		-62.5	36.9	+8.0		370	
		-58.0	41.4	+6.5	340		
		-3.0	96.4	-28.5		62	
		+0.5	99.9	-28.0		185	
		+4.5	103.9	-27.5	216		
		+62.5	161.9	+21.0	6		1,404
July 8 (Naval Observatory)	11 33	-74.0	12.0	+13.5	154		
		-53.0	33.0	-10.5		185	
		-51.0	35.0	+8.0		401	
		-45.0	41.0	+7.0	293		
		+12.5	98.5	-28.0		154	
		+18.0	104.0	-27.5		139	
		+68.5	154.5	+18.0	15		1,341
July 9 (Naval Observatory)	11 39	-60.5	12.2	+13.5	154		
		-40.0	32.7	-10.5		154	
		-38.0	34.7	+8.0		370	
		-31.0	41.7	+7.0	340		
		-18.0	54.7	-4.0	15		
		+26.5	99.2	-28.0		139	
		+30.5	103.2	-27.5		154	1,326
July 10 (Harvard)	9 10	-49.0	12.0	+15.0	270		
		-27.5	33.5	-10.0		103	
		-21.5	39.5	+8.0		896	
		+42.0	103.0	-27.5		210	1,479
July 11 (Naval Observatory)	11 58	-33.5	12.6	+13.5	154		
		-15.5	30.6	-4.5		22	
		-13.0	33.1	-11.0		93	
		-11.5	34.6	+8.0		370	
		-9.0	37.1	-10.5		81	
		-3.5	42.6	+7.0		340	
		+53.0	99.1	-28.0		93	
		+58.5	104.6	-27.0	123		1,226

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longi- tude	Lat- itude	Spot	Group	
1928—Continued							
July 12 (Naval Observa- tory).	h. m. 11 48	° -68.0 -20.5 -8.0 -1.0 -0.5 +2.5 +9.0 +71.5	° 324.9 12.4 24.9 31.9 32.4 35.4 41.9 104.4	° -20.0 +13.0 -10.5 -5.0 -11.0 +8.0 +7.0 -27.0			309 170 31 62 93 370 278 1,436
July 13 (Naval Observa- tory).	12 6	-88.0 -70.5 -56.5 -48.0 -32.0 -7.0 +10.5 +13.0 +16.0 +17.0 +21.0 +24.5	291.5 303.0 323.0 331.5 347.5 12.5 30.0 32.5 35.5 36.5 40.5 44.0	+9.5 +9.0 -21.0 -18.5 +7.0 +13.0 -5.0 -11.0 -5.5 +8.0 +7.0 +6.0		216 247 216 278 25 154 37 31 15 370 108 154	1,851
July 14 (Naval Observa- tory).	11 2	-74.5 -63.0 -62.0 -49.5 -40.5 -34.0 -17.5 +6.5 +23.0 +29.0 +29.5 +33.5 +38.0	292.4 303.9 304.9 317.4 326.4 332.9 349.4 13.4 29.9 35.9 36.4 40.4 44.9	+10.0 +9.0 -26.5 -15.5 -20.0 -18.5 +6.0 +13.0 -5.5 -6.0 +8.0 +7.5 +5.5		247 370 6 6 278 324 6 139 25 31 340 62 123	1,957
July 15 (Naval Observa- tory).	11 29	-64.5 -61.0 -49.5 -35.5 -30.0 -22.0 +19.5 +37.5 +43.5 +51.0	288.9 292.4 303.9 317.9 323.4 331.4 12.9 30.9 36.9 44.4	-10.0 +10.0 +9.5 -15.0 -21.0 -18.0 +13.0 -4.5 +8.0 +5.0	12	370 340 31 370 432 154 31 432 170	2,342
July 16 (Naval Observa- tory).	11 33	-51.5 -49.5 -47.5 -43.5 -36.0 -20.5 -15.0 -7.5 +33.0 +50.5 +57.5 +62.5	288.6 290.6 292.6 296.6 304.1 319.6 325.1 332.6 13.1 30.6 37.6 42.6	-11.0 +5.0 -8.5 +13.5 +8.0 -15.0 -21.0 -18.0 +13.0 -4.5 +8.0 +5.0		62 62 247 6 216 9 463 370 123 15 401 154	2,128
July 17 (Naval Observa- tory).	11 37	-51.5 -38.0 -35.5 -33.5 -30.0 -22.0 -2.0 +7.0 +46.0 +70.0 +75.5	275.4 288.9 291.4 293.4 296.9 304.9 324.9 333.9 12.9 36.9 42.4	+18.0 -10.5 +5.0 +9.0 +12.5 +8.5 -21.0 -18.0 +13.0 +8.0 +5.0		15 46 77 231 93 231 463 432 123 370 154	2,235
July 18 (Naval Observa- tory).	11 39	-39.5 -28.5 -23.0 -21.0 -20.0 -17.0 -9.5 +11.5 +20.0 +27.5 +59.0 +82.5	274.1 285.1 290.6 292.6 293.6 296.6 304.1 325.1 333.6 341.1 12.6 36.1	+18.0 +8.5 -10.5 +5.5 +8.5 +12.5 +9.0 -21.0 -18.0 +2.5 +13.0 +8.0		77 6 31 77 216 31 201 617 370 37 139 309	2,111
July 19 (Naval Observa- tory).	11 44	-27.0 -13.0 -11.5 -9.0 -7.5 -6.0 +4.0 +23.5 +32.5 +39.0 +49.5 +71.5	273.4 287.4 288.9 291.4 292.9 294.4 304.4 323.9 332.9 339.4 349.9 11.9	+17.5 +7.0 -10.5 +5.5 +8.5 +12.5 +9.0 -21.0 -18.0 +2.0 +7.5 +13.0		93 46 9 56 247 62 185 432 370 37 31 139	1,707

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longi- tude	Lat- itude	Spot	Group	
1928—Continued							
July 20 (Naval Observa- tory).	<i>h. m.</i> 12 3	° -81.0 -16.0 -10.5 -1.0 +3.5 +7.5 +8.0 +18.0 +37.0 +47.0 +53.5 +67.0	° 206.0 271.0 276.5 286.0 290.5 294.5 295.0 305.0 324.0 334.0 340.5 354.0	° +13.0 +18.0 +17.0 +8.0 +5.0 +9.0 +13.0 +9.0 -21.0 -18.0 +2.5 +7.5		154 31 62 31 62 185 77 185 340 370 31 9	
July 21 (Harvard)	9 39	-70.0 -65.0 +20.5 +54.0	205.0 210.0 295.5 329.0	+14.5 -19.5 +10.0 -19.0	270 38	493 754	1,555
July 22 (Naval Observa- tory).	13 2	-59.5 -53.5 -49.5 +20.0 +22.0 +32.5 +34.0 +44.5 +62.0 +66.5 +75.0	200.5 206.5 210.5 280.0 282.0 292.5 294.0 304.5 322.0 326.5 335.0	+12.5 +13.0 -20.0 -8.0 +5.0 +13.5 +9.0 -9.5 -22.5 -20.0 -18.0	22 9 108	31 154 15 40 185 154 46 370	1,134
July 24 (Naval Observa- tory).	12 8	-68.5 -65.0 -38.0 -31.0 -28.0 -23.5 +58.0 +59.5 +60.5	165.5 169.0 196.0 203.0 206.0 210.5 292.0 293.5 294.5	-11.0 +5.5 +17.5 +14.0 +13.0 -19.5 -20.0 +9.0 +9.5	31 108 123	154 9 93 6 201 154	879
July 25 (Naval Observa- tory).	11 54	-80.0 -70.0 -58.5 -53.5 -23.0 -17.5 -15.0 +49.5 +71.0 +72.5 +85.0	140.9 150.9 162.4 167.4 197.9 203.4 205.9 270.4 291.9 293.4 305.9	-22.5 -21.0 -17.0 +5.5 +17.0 +14.0 +13.0 +15.0 -20.0 +9.0 +9.5	108 93 25 123	247 15 93 15 62 201 123	1,105
July 26 (Naval Observa- tory).	11 55	-67.5 -64.0 -58.0 -39.5 -10.0 -4.5 -2.0 +62.5	140.1 143.6 149.6 168.1 197.6 203.1 205.6 270.1	+14.5 -22.5 -20.5 +5.5 +17.0 +14.0 +13.0 +15.0	108 93 139	46 240 77 6 46	855
July 27 (Mount Wilson)	10 0	-56.5 -50.0 -26.0 +11.0 +77.0	138.9 145.4 169.4 206.4 272.4	+14.5 -22.0 +5.0 +14.0 +16.5		64 482 44 131 166	887
July 28 (Naval Observa- tory).	11 11	-83.5 -83.0 -44.5 -40.0 -39.0 -32.0 -16.0 -11.0 +24.0	98.1 98.6 137.1 141.6 142.6 149.6 165.6 170.6 205.6	-15.0 +7.0 +13.5 +12.5 -22.0 -20.5 +5.5 +5.5 +13.0	123 247 108 77 108	108 231 31 25	1,058
July 29 (Naval Observa- tory).	11 33	-70.5 -66.0 -63.5 -30.0 -27.5 -18.0 +1.5 +38.0	97.7 102.2 104.7 138.2 140.7 150.2 169.7 206.2	+7.5 -25.0 -15.5 +14.0 -21.0 -20.0 +6.0 +13.5	46 62 62 93	185 586 185 93	1,312
July 30 (Naval Observa- tory).	11 38	-57.0 -56.0 -54.0 -49.5 -48.0 -15.5 -12.5 -4.0 +12.5 +19.0 +51.5	97.9 98.9 100.9 105.4 106.0 139.4 142.4 150.9 167.4 173.9 206.4	+7.5 -14.5 -25.0 -15.5 +13.0 +13.5 -21.0 -20.0 +6.0 +7.0 +13.5	6 62 46 46 93	185 31 617 93 62 46	1,287

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longi- tude	Latitude	Spot	Group	
1928—Continued							
July 31 (Naval Observa- tory).	<i>h.</i>	°	°	°			
	<i>m.</i>						
	11 42	-43.5	98.1	+7.5		170	
		-43.0	98.6	-14.5	3		
		-42.5	99.1	-25.0	31		
		-35.5	106.1	-15.5	46		
		-34.5	107.1	+13.0		15	
		-6.0	135.6	+14.0		370	
		+1.0	142.6	+13.0	370		
		+1.5	143.1	-20.0		31	
		+9.3	151.1	-20.0		37	
		+25.5	167.1	+7.0		37	
		+30.5	172.1	+7.0		62	
		+65.0	206.6	+13.5	108		
Mean daily area for July							1,280
							1,434

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR JULY, 1928

[Data furnished by Prof. A. Wolfer, University of Zurich, Switzerland]

July	Relative numbers	July	Relative numbers	July	Relative numbers
1	125	11	69	21	127
2	135	12	127	22	114
3	133	13	131	23	77
4	88	14	132	24	54
5	59	15	149	25	60
6	52	16	145	26	66
7		17	133	27	66
8	97	18	118	28	76
9	91	19	124	29	98
10	85	20	129	30	97
				31	105

Number of observations, 30; mean, 101.2.

AEROLOGICAL OBSERVATIONS

By W. R. STEVENS

Free-air temperatures for July were slightly below normal at Ellendale and Groesbeck, but were slightly above at the other kite stations.

There were no important departures from the normal relative humidity at levels where observations were frequent enough to give reliable monthly means.

Vapor pressures were quite generally above normal, except for the higher levels at Ellendale, Groesbeck, and Royal Center.

Wind resultants as determined from pilot balloons were almost entirely of southerly component near the surface, but at the majority of the stations shifted gradually to northerly component with altitude. The base of the antitrades was reached on a few occasions at San Juan, the altitude ranging between 5,000 and 9,000 meters. Easterly winds at high levels were observed at a number of stations in the Northwest from the 19th to the 25th. As is usual in conditions of this kind, there was a lack of cyclonic activity over that section. A double-theodolite pilot-balloon observation at Ellendale on the afternoon of the 12th showed fairly strong convective currents from the surface to the point where it entered cumulus

TABLE 1.—Free-air temperatures, relative humidities and vapor pressures during July, 1928—Continued

RELATIVE HUMIDITY (%)												
Altitude m. s. l.	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)		Washington, D. C. (7 meters)	
	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal
<i>Meters</i>												
Surface	73	+4	72	+6	72	+3	84	+9	66	+4	67	-5
250	73	+4	73	+7			85	+9	66	+4	70	-8
500	74	+8	76	+8	72	+4	85	+6	65	+1	65	-4
750	71	+7	73	+4	70	+6	72	0	69	+3	61	-5
1,000	63	0	72	+2	70	+8	63	-4	71	+3	61	-4
1,250	57	-6	73	+2	70	+10	59	-5	72	+4	64	-2
1,500	57	-5	73	+2	68	+10	55	-7	68	+1	66	-1
2,000	53	-6	73	+2	59	+4	51	-8	61	-2	70	+2
2,500	51	-7	74	+4	57	+4	51	-7	60	+3	62	-4
3,000	55	-3	68	0	52	+1	46	-11	32	-19	35	-25
3,500	55	-2	69	+1	49	-1	40	-17	30	-18		
4,000	56	-1			41	-9	36	-24	28	-15		
4,500	60	+7			40	-10	36	-5				

VAPOR PRESSURE (mb.)

Surface	26.39	+2.36	24.94	+1.77	18.23	+1.12	26.51	+0.88	21.04	+1.55	27.05	+4.30
250	26.17	+2.35	24.68	+1.84			25.71	+0.96	20.75	+1.54	23.41	+2.84
500	25.2	+0.3	23.8	+0.5	17.66	+1.12	23.24	+0.76	18.01	+1.00	19.63	+1.79
750	23.9	+0.4	22.7	+0.1	19.98	+1.30	15.34	+0.99	19.27	-0.37	16.68	+1.10
1,000	21.05	+0.99	17.99	+0.76	13.91	+1.06	15.93	-1.07	15.16	+0.79	15.63	+1.15
1,250	15.33	-0.10	16.45	+0.60	12.64	+1.11	13.73	-1.28	13.45	+0.48	14.59	+1.31
1,500	13.91	+0.04	14.88	+0.56	11.22	+0.92	11.87	-1.60	11.38	-0.17	13.36	+1.08
2,000	10.76	-0.23	12.26	+0.58	8.21	-0.08	9.21	-1.74	8.11	-0.74	11.39	+1.30
2,500	8.54	-0.29	10.17	+0.79	6.41	-0.31	7.66	-1.35	5.90	-0.59	8.72	+0.60
3,000	7.51	+0.30	7.83	+0.26	4.87	-0.54	6.01	-1.58	3.06	-1.81	4.98	-1.25
3,500	6.35	+0.42	6.60	+0.38	3.94	-0.56	4.75	-1.66	2.06	-1.75		
4,000	5.88	+1.03			3.02	-0.70	4.04	-1.70	1.75	-1.07		
4,500	5.23	+1.43			2.63	-0.54	3.86	-0.22				

TABLE 1.—Free-air temperatures, relative humidities and vapor pressures during July, 1928

TEMPERATURE (°C.)

Altitude m. s. l.	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)		Washington, D. C. (7 meters)	
	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal	Mean	De- parture from normal
Meters												
Surface	27.4	+0.8	26.6	-0.5	21.3	+0.3	25.1	-1.5	25.1	+0.2	29.1	+4.3
250	27.2	+0.7	26.2	-0.5			24.4	-1.3	24.9	+0.3	25.9	+3.0
500	25.2	+0.3	23.8	-0.5	20.7	+0.1	23.2	-0.7	22.6	+0.5	24.2	+2.7
750	23.9	+0.4	22.7	+0.1	18.8	-0.4	22.6	-0.2	20.3	0.0	23.0	+2.6
1,000	23.3	+1.2	21.2	+0.3	17.3	-0.7	21.7	0.0	18.3	-0.2	21.3	+2.3
1,250	22.4	+1.8	19.5	+0.3	15.9	-1.0	20.5	0.0	16.5	-0.4	19.3	+1.8
1,500	21.0	+1.9	17.9	+0.3	14.7	-1.0	19.2	0.0	14.9	-0.5	17.3	+1.3
2,000	18.2	+2.1	14.8	+0.5	12.1	-0.9	16.4	-0.1	11.9	-0.6	13.3	+0.3
2,500	15.2	+2.2	11.7	+0.5	9.2	-0.9	13.1	-0.5	8.5	-1.3	10.4	+0.2
3,000	12.0	+2.2	8.8	+0.5	6.1	-1.1	10.0	-0.7	7.8	+0.7	8.8	+1.2
3,500	9.5	+2.6	5.9	+0.6	3.1	-1.2	6.8	-0.9	5.2	+0.9		
4,000	7.0	+3.1			0.4	-1.2	3.8	-0.9	2.5	+1.0		
4,500	4.3	+2.9			-2.6	-1.7	0.7	-2.1				

1 Naval air station.

clouds at 1,400 meters. The highest vertical velocity observed was 3.2 m. p. s. between 750 meters and 1,100 meters. Another observation at the same station on the afternoon of the 27th showed an average vertical velocity of 2 m. p. s. from the surface to 1,715 meters where the balloon entered strato-cumulus clouds. The maximum vertical velocity was 2.9 m. p. s. between 1,250 and 1,600 meters.

The month was quite generally unfavorable for daily kite work. Flights at most stations were necessarily limited as to altitude and frequency because of light winds and the frequent occurrence of thunderstorms.